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BOVINE STERILITY

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I do not propose to deal with sterility in general but merely with a brief survey of our present knowledge appertaining to bovine sterility. I give this warning, because the agenda published in the *Veterinary Record* will probably have led some to expect a dissertation on infertility in mares. There is little doubt that breeding troubles in cows and mares are two totally different problems.

This particular trouble is one which should be given equal rank with the four major diseases of cattle, as they are usually regarded, namely, tuberculosis, Johne's disease, contagious abortion and mastitis. Craig[1] states that in four surveys the percentage of disposal from dairy herds due to various conditions was as follows :—

	1	2	3	4
Sterility	17·2	23·7	26·8	11·5
Udder disease	15·0	7·0	4·7	9·2
Abortion	2·1	3·6	3·8	8·0
Advanced tuberculosis and Johne's disease ...	5·4	10·4	9·6	7·6

There is also the loss due to interference with the milk yield.

What exactly do we mean by sterility? For a moment we will consider the definitions given by Crew[2].

Fecundity is " the potential reproductive capacity of individuals and is measured by their ability to elaborate functional gametes, the ova or sperms."

Fertility is " the ability to produce living offspring and is measured by the rate at which these are produced compared to the standard of absolute fertility when every possible ovum is fertilised and every zygote survives."

Sterility is " the negation of fertility."

A number of writers, including Tutt[3], disagree with this definition of sterility. They consider sterility to be inability to conceive on the part of the cow or inability to fertilise the cow on the part of the bull, and this is the picture most of us have in our minds when we speak of bovine sterility.

As in the case of many other problems confronting the veterinarian, progress in the methods of tackling this trouble has been relatively slow. General interest in this subject was quickened by visits in 1924, 1925 and 1926 by Professor Fölmer Nielsen of Copenhagen.

Like mastitis, sterility is not a single entity. Many different factors may be involved, and organs as far removed from each other as the vagina and pituitary body can contribute to breeding troubles.

As in the case of canker a very large number of drugs have been used in an effort to alleviate the trouble. Fortunately, on the whole, the lines of treatment have been far less drastic in the case of bovine sterility.

At the outset, one must realise that the bull can be, and is, responsible for all or much of the sterility in many herds and, where sterility to any great extent, exists in the herd, he should be under suspicion. At the same time, I do not think as much trouble is present in our bulls as one would expect after perusing some of the works of some of our Continental confrères. Undoubtedly, infertility is common in bulls on the Continent. We are singularly fortunate in that there is an ample supply of good bulls in these Islands. For that reason alone, I do not think that artificial insemination will ever make much headway here. Naturally, it is a far different proposition in those countries which have to import bulls. Natural service gives better results than the artificial method. In view of what I have said I have few comments to make on sterility in the bull. Some of the conditions interfering with the bull's ability to breed are obesity, weakness of the hind quarters, foreign body in reticulum, overuse, balanitis (due to coital exanthema or trichomoniasis), cryptorchidism, orchitis (often due to *Brucella abortus*), abscess formation in the seminal vesicles, degenerative changes in the testicles resulting in inability to elaborate healthy or sufficient spermatozoa, etc. It must be remembered that even if the spermatozoa are normal individually they must be present in sufficient numbers, otherwise the ovum may not be fertilised (the average number of sperms per c.c. in the bull is 800,000, but within normality this number may vary from 300,000 to 1,200,000). It would appear that a mass attack is necessary for even one of the spermatozoa to reach the ovum. Here I should like to sound a note of warning. If the bull is under suspicion and a sample of semen is taken for examination, one should not be too dogmatic if the spermatozoa are healthy and present in sufficient numbers as some bulls give a perfect picture one day and the exact opposite the next. Such a bull is, of course, not responsible for absolute sterility in the herd, but may be responsible for some of the healthy cows and heifers " turning."

With regard to the cow, before considering abnormalities in the genital tract we will briefly discuss the various stages in the normal sexual cycle and how these stages are influenced by different hormones.

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The rhythmically occurring oestrous cycles are associated with changes in the reproductive organs, and these changes normally go hand-in-hand with the succession of periods which constitute each cycle. Further, the cycle and the accompanying external and internal manifestations in the animal are only possible under the influence of hormones present in the blood and secreted by certain glands and tissues. In the normal cow the duration of the complete oestrous cycle is approximately 21 days, and the climax may be said to be the time when the animal is on heat (oestrus) which rarely lasts more than 24 hours in the normal cow. On the other hand, it may be of only two or three hours' duration. Immediately prior to oestrus is a short period (pro-oestrus) of a few hours, and the period of heat is immediately followed by a very brief period of a few hours (metoestrus). After this there is a relatively quiescent period of approximately 20 days (dioestrus). During these periods a cycle of changes occurs in the reproductive organs. Thus during dioestrus the reproductive organs remain normal, but as the period of heat approaches a Graafian follicle rapidly ripens in the ovary under the stimulus of prolan A (so designated because it can be extracted in an acid medium), the gonadotrophic hormone secreted by the anterior pituitary body. The oestrus occurs under the influence of oestrin, an internal secretion elaborated in the follicle and interstitial tissue of the ovary.

During this time the uterus undergoes a degree of hypertrophy and increased vascularisation in readiness to receive the ovum in case fertilisation ensues. At the same time the well-known psychological changes take place, the cervix dilates and the cervical mucus becomes very fluid and flows from the vulva.

Leucocytes appear in the vaginal smear. Haemorrhage frequently results from the engorged capillaries and blood is discharged from the vulva, in many cases about 72 hours after oestrus. This occurs particularly in heifers and fat cows. The belief that this appearance of blood denotes that fertilisation has not occurred is wrong in many instances. About 40 hours after the onset of oestrus, ovulation occurs and there is a rapid proliferation of the cells lining the follicle, and in this way the corpus luteum is formed. This atrophies if fertilisation has not ensued. The uterus returns to normal. If the corpus luteum is expressed oestrus recurs in two to six days, although its return may be scarcely discernible.

If conception does not take place at this artificially induced oestrus, heat reappears after a further three weeks. The duration of oestrus is shorter in the winter than in the summer.

In cattle housed during the winter "silent heat" may occur, *i.e.*, ovulation without the outward signs of heat. In other cases a short oestrus may be missed due to its occurring at night.

If fertilisation is effected, the corpus luteum grows and persists throughout pregnancy during which time it secretes the hormone progestin which inhibits oestrus, stimulates proliferation of the endometrium and hypertrophy of the mammary glands. When parturition approaches the hormones relaxin and prolactin are responsible for the relaxation of the pelvic ligaments and for stimulation of the mammary secretion respectively. Prolan B produced in the posterior pituitary body stimulates contraction of the uterine muscle.

The Genitalia and Sterility

I propose next to survey briefly the various diseased conditions likely to cause sterility met with in the genital organs. At the same time I shall be quite unorthodox in so far as I shall start with the uterus and not with the ovaries or vagina as is customary. My reason for starting with the uterus itself is that in my experience endometritis in one form or another is the most frequently encountered disease of the female genitalia and endometritis is frequently the forerunner of abnormalities elsewhere in the reproductive apparatus.

Perhaps at this stage, a few words on the method of tackling a case of bovine sterility will not be out of place. First, as complete a history as possible must be obtained: how many calves has the cow had; when did she have her last calf; was it a normal calving and did she cleanse normally; has the cow ever aborted; has she been blood-tested and what was the result; how many times has she been served since the last parturition; what was the date of the last service; does she come "bulling" regularly or are there any further abnormalities such as continuous oestrus or anoestrus; has any discharge from the vulva been observed; is the bull "stopping" other cows; is the cow a high yielder; what ration is she getting and is it similar to that received by in-calf cows on the farm?

One may now proceed to an examination of the genitalia by rectal palpation. Throughout sterility work one hand and arm should be reserved for rectal work and the other for vaginal manipulation. The nails should be well pared down. In the case of a right-handed individual that hand and arm are better used for the rectum and they should be well lubricated with vaseline, oils or some obstetrical paste. The tail should be drawn forward by an assistant who can also record your findings. It is important to have this done so that they can be compared with those of a subsequent examination. For this purpose, I use forms with appropriate headings which are useful for recording the history of the case as well as the clinical state of affairs. The right hand and arm should be passed carefully through the anus and the animal back-raked. Attempts to palpate the genital organs must be delayed when strong peristalsis occurs. The manipulation can be continued when muscular relaxation returns. If necessary, the back must be pinched. A start should be made with the vagina. Is it ballooned? The cervix is next examined and its position noted. Its anterior width (*a*), its length (*b*) and its posterior width (*c*) should be estimated and recorded on the form as a x b x c. Next, the uterine horns are examined and usually I first palpate the left horn estimating its width and depth, whether it is contracting and whether it is slack or tense. I then proceed to an examination of the right horn and note the distance of the anterior curvature of the horns in front of the pelvic brim, and the extent to which the horns are curled. Then I examine the right ovary, estimating its length, breadth and depth and noting the exact size and position of any corpus luteum or cysts. Before leaving the right side I ascertain whether the right Fallopian tube is palpable or not. The left ovary and Fallopian tube I examine in the same way. If pregnancy is diagnosed or suspected, the middle uterine arteries are palpated and any vibration noted.

Following rectal examination, the vulva is well washed with soap and water. Vaseline or other suitable lubricant is smeared on the back of the left hand which has been well scrubbed in an antiseptic solution. This vaseline is first used to lubricate the lips of the vulva; the left hand is then inserted into the vagina and the presence or absence of any uterine discharge collected there is noted. The condition of the *os* is ascertained. Is it wide open or contracted? The *os* can be examined by retracting the cervix with a pair of vulcellum forceps which are manipulated inside the vagina by the left hand and outside by the right hand. As has been stated by Craig[4] the application of these forceps promotes congestion and a much better picture of the state of affairs is obtained by using a speculum and electric torch.* With these aids the condition of the vaginal mucous membrane as well as that of the *os* can be noted. Later, should treatment be adopted, manipulation of the *os* is carried out with the left hand, the right hand handling the instrument outside the vulva.

In any case, a thorough rectal examination must always be made before treatment is carried out. The fact that a cow is turning to the bull does not mean necessarily that she is not in calf. A number of cows are encountered which will take the bull right up to the time of calving.

Endometritis

As you know, the Agricultural Research Council Abortion Eradication Scheme has been in operation for some years. A number of herds are now abortion-free and a comparison of the breeding trouble in some of these herds before and after being freed from this disease is quite instructive. Equally instructive is a comparison of the breeding efficiency in the clean and infected groups where segregation is practised. In several herds the fertility has risen from 60 to 80 per cent. Such cases as these plus those encountered in sterility work lead me to suggest that contagious abortion is the most important single predisposing cause of sterility in cows. I purposely say "predisposing," because I share the view held by Professor Nielsen[5] that by the time the case is one of sterility the *Brucella abortus* is probably absent from the uterus. The majority of cows suffering from endometritis are reactors to the agglutination test and many of them have a history of having slipped at least once. Whether such cows abort or carry their calves full time the uterus is in an unhealthy state. Owing to the prevailing conditions, particularly if the foetal membranes are retained, there is soon an enormous bacterial flora and these bacteria, as much as the brucella, are responsible for the chronic endometritis encountered when the cows keep turning to the bull. Nielsen[6] explains a well-known fact, *viz.*, that sterility is commoner when abortion is running a chronic rather than an acute course in the herd. In the former case calves are carried longer and retention of foetal membranes and delay in involution is commoner. In the acute cases abortion is early and the foetus and membranes are frequently expelled together. In large numbers of either of these conditions, no organisms are to be found in the uterus when there is difficulty in getting the cow into calf. In these cases, we are dealing with the results of bacteria and not with the bacteria themselves. Neilsen[7] classified the various types of endometritis, his classification being based on an earlier one by Richter. He recognised five types which are briefly as follows:—

1. Puerperal endometritis.

The following occur any time longer than three weeks after parturition.

2. Endometritis of first degree—a slight inflammation, at the most accompanied by only very small amounts of purulent material; there is no conspicuous flow.
3. Endometritis of second degree—*i.e.*, chronic catarrhal endometritis.
4. Endometritis of third degree—in reality pyometra.
5. Endometritis of fourth degree—chronic endometritis with cystic degeneration of the ovaries.

For all practical purposes, we need only consider Nielsen's degrees 1, 2 and 3. Puerperal endometritis either kills the cow or has taken on a chronic course before the animal is presented as a sterility case. Degree 4 can be considered as a complication of degrees 1, 2 or 3.

Endometritis of the first degree.—There is little to be discovered on rectal or vaginal examination. There may be some thickening of the uterine wall, which feels doughy. A little pus may be massaged through the cervix by rectal manipulation. In spite of repeated service, the animal consistently returns to the bull; the ovaries usually appear to be normal.

Endometritis of the second degree.—Per rectum, the uterus is enlarged and this enlargement generally involves both horns. The cervical canal will usually be wider than normal; there will be a fairly abundant secretion, varying from mucus to pus. The animal may or may not come into oestrus.

Endometritis of the third degree.—In this type, there is an accumulation of varying quantities of exudate in the uterus. *Per rectum*, the uterus will appear to be considerably enlarged; the horns may or may not be equally distended; they may be four, six or more inches wide and the anterior curvatures may not be palpable as they may have gone forward into the abdomen. Usually vaginal discharge is noticed only at intervals; at other times the cervical canal is closed. Vaginal examination generally reveals a vaginitis secondary to the uterine trouble and brought about by the purulent material flowing over the vaginal mucosa. Varying amounts of purulent material will be found collected on the vaginal floor.

*This combination of the vaginal speculum and electric torch is of great assistance. As stated, it is extremely useful in obtaining an accurate knowledge as to the state of affairs in the vagina—inflammation, the presence of pus, the condition of the external *os*, the presence of cysts, etc.

I use the Russian speculum which has been modified to open wider than the usual model. In addition a device has been fitted so that the speculum can be fixed in position. This modified type of speculum is very handy for rapid examination of the vagina (an important point when a number of cows are to be examined) and also for artificial insemination.

Some of the more elaborate specula appear impressive, but should be reserved for those who examine or give demonstrations with only an occasional cow.

Contrary to general belief, the speculum can be inserted without resort to lubricants apart from water. One should become acquainted with the appearance of normal vaginal mucus as it appears in the beam of an electric torch. To the uninitiated, this might readily be mistaken for pus.

Trichomoniasis

Now we are talking of pyometra, I think this would be an appropriate point to say a few words about trichomoniasis, concerning which we have heard much during the past few years. The disease is spread by coitus and there is no doubt that this flagellate protozoon (known as *Trichomonas foetus*) is responsible for much trouble in certain areas.

The disease is characterised by balanitis in the bull. In the cow, service by an infected bull is followed rapidly by vaginitis which may be accompanied by muco-purulent discharge. This vaginitis subsides within the course of two or three days and can be followed by (*a*) endometritis, (*b*) conception and abortion during the first four months of gestation, (*c*) death and maceration of the foetus leading to pyometra which may also follow directly from (*a*). Often the only history one has is that a number of cows in the herd are turning to the bull about the third or fourth month after service. Some of the animals show a vaginal discharge which is of a mucous nature and contains characteristic floccules. Careless rectal examination of some of the animals which appear to be "holding" will mislead the clinician into declaring that they are in calf as in many of them there is an enlargement of one horn and the enlargement is often of the degree expected at that particular stage of pregnancy. Further examination a few weeks later might still be misleading as the enlargement will probably have increased in the meantime. However, more careful rectal examination reveals great fluctuation and less tension than is customary in the pregnant horn. Again, if the animal is examined more than three months after service, there is no vibration of the middle uterine artery on the side of the distended horn. Whilst most errors are likely to arise when one horn is distended, distension of both horns is likely, though less so, to give rise to the diagnosis of twins. In old standing cases, the cotyledons are not palpable and in such instances their absence will aid diagnosis. A positive diagnosis of trichomoniasis should only be given when the parasite is demonstrated microscopically. Fresh uterine material or material from the stomach of a recently aborted foetus should be examined using a drop preparation as recommended by Stableforth and Scorgie[8] so that if trichomonads are present they are motile. Keeping the material in a warm room or in the waistcoat pocket a short time before examination will increase motility. Many cases erroneously diagnosed as trichomoniasis are undoubtedly due to epithelial cells, which are abundant in all uterine secretions, being mistaken for the protozoon. It is very difficult to distinguish between the non-motile parasites and these epithelial cells.

In the southern half of England during the last few months, there has been a marked increase in so-called "whites." The discharge has been yellower and had a more foetid odour than is usually encountered in typical leucorrhoea. The trouble has appeared under varying circumstances. In some cases cows have calved and cleansed normally, but three or four days later a purulent discharge from the vulva commences and in some cases is very profuse; in others, there is retention of the foetal membranes which may or may not follow abortion and, after the usual chocolate-coloured discharge for ten days, the yellow discharge commences. In still further cases, the discharge appears a few days after the cow or heifer has been bulled. Finally, the trouble may commence after the cow has been bulled three or four months and is apparently "holding." Rectal examination in these cases reveals a catarrhal endometritis or pyometra; the latter is frequently unilateral and is liable to be confused with pregnancy before the onset of the discharge. To all intents and purposes many of these cases are typical of trichomoniasis but careful and repeated examination of uterine material fails to reveal any trichomonads. Generally, the discharge is yellower and more purulent than that seen in trichomoniasis. In about 80 per cent. of these cases which I have encountered, *Corynebacterium pyogenes* has been isolated in pure culture from the uterine material. This material has the same odour as that usually associated with the mammary secretion in typical cases of summer mastitis. In these particular cases there would appear to be no history of early abortion as in trichomoniasis but, of course, it is very difficult conclusively to rule out expulsion of tiny foetuses in many instances. *C. pyogenes* has been isolated from several cases of puerperal metritis in cows. Stableforth (private communication) has isolated the organism from one or two slipped calves in herds which are brucella free. Heatley[9] some years ago cited a herd where probably the same trouble as this had existed for ten years. In this herd all cows, after calving, had to be treated, otherwise leucorrhoea showed in nine or ten days.

Treatment of Endometritis.—Regarding the treatment of endometritis, this, of course, varies to some extent with the type of the trouble with which the clinician is faced. The sooner an endometritis case is taken in hand the more favourable the prognosis. In simple chronic endometritis some slight counter irritation of the genital tract is all that is necessary. Some form of iodine seems to be as good as anything for this purpose. An aqueous solution of iodine is most commonly used but some prefer iodine and glycerin in water or iodoform and glycerin in water. The method of carrying out iodine lavage is as follows:—

The vulva and surrounding skin is well washed with soap and water; the hands are scrubbed in disinfectant, vaseline is smeared on the back of the left hand and, with an assistant pulling the tail forward, the left hand is inserted into the vagina. The instruments are close at hand in a bucket of disinfectant solution. Vulcellum forceps are held in the right hand and passed into the vagina, being directed by the left hand. A firm hold is taken just to the side of the *os* and the cervix is slightly retracted and held so by an assistant. Next, the end of a uterine catheter (single or double) is passed into the vagina, directed into the *os* and carefully passed through the cervical canal using a wriggling movement of the right hand. There may be some little difficulty in getting the catheter through the canal. It may have to be withdrawn slightly several times as the end tends to be held up in folds of the mucous membrane. At all times the operation must be performed with care otherwise damage and subsequent infection of the cervix is likely to result. When the end of the catheter passes through the canal, the left hand is withdrawn from the vagina and grasps the catheter outside the vulva. The right hand which is previously lubricated is passed into the rectum and the end of catheter is directed into each horn in turn. In cases of simple endometritis about 125 c.c. of 1 : 500 aqueous iodine

solution is injected into each horn. Sometimes in heifers it is not possible to put the left hand in the vagina. In such cases the cervix must be held in the right hand in the rectum and a fine catheter with a stop is worked through the cervical canal. When a fine catheter is used in cows or heifers there is always the danger of perforating the uterine wall. This is immediately discovered by the right hand. No untoward effects result if the case is one of simple endometritis. The end of the catheter is withdrawn into the uterus and then carefully directed into each horn in turn. The perforation usually occurs at the bifurcation.

Much harm is done by a combination of damaging the cervix when passing the catheter and using a strong iodine solution. The strong iodine solution badly upsets the cow and reduces her milk yield for a lengthy period. It may cause severe damage to the uterine mucosa and certainly suppresses oestrus for some considerable time in many cases. Quite often cows show tympany when too much iodine has been injected into the horn of normal size. This, it is understood, is due to iodine passing along the Fallopian tube and setting up local mechanical peritonitis. It must be remembered that the iodine is being used as a stimulant or irritant and not as a bactericide, and that fairly weak solutions perform this function as well as do strong solutions. Some workers merely pass the catheter just through the cervical canal and then inject the iodine, claiming that the iodine will go into both horns and that if one horn is more diseased than the other it will be the larger and will receive a bigger share. It is interesting to note that some people claim that the necessary stimulation occurs when the iodine is passing out through the cervical canal and, in fact, that the actual passage of the catheter is sufficient stimulation. In this respect, it is worthy of record that as long ago as December, 1923, Tutt[10] mentioned dilatation of the cervix in the treatment of endometritis, and L. P. Pugh[11] spoke of painting the cervix with iodine. In New Zealand, good results are claimed for introducing 10 per cent. ichthyol in glycerine into the *os* on a swab with the same object in view.

When dealing with cases of catarrhal endometritis or pyometra a two-way catheter is used which is passed without the aid of vulcellum forceps (if possible) for reasons to be described later. Each horn is irrigated in turn with 1 : 1,000 aqueous solution of iodine until no further pus comes away. This is repeated at weekly intervals twice or more. When cases of catarrhal endometritis are tackled soon after calving, good results are obtained by this method even when *C. pyogenes* is the causal organism, but in neglected cases or pyometra cases due to this organism the prognosis is not at all favourable. On several farms where *C. pyogenes* infections in cows' uteri are common, irrigation of the uterine horns of all cows or heifers is being carried out one week after calving with apparently very good results. Usually one such irrigation is sufficient. A number of cows with *C. pyogenes* uterine infections (parametritis, catarrhal endometritis or pyometra) have received a course of toxoid (prepared by Dr. Lovell). Three doses of 10 c.c. are given at fortnightly intervals. This toxoid is a formalised toxin which is precipitated with alum. Dr. Lovell has shown that *C. pyogenes* isolated from some of these cases is like other strains, a toxin producer. A large-scale field experiment is now being arranged whereby half the cows and heifers in several herds where this trouble has been common are being injected; the other half are being left as controls. In this way it is hoped an answer will be given to the question as to whether toxoid will protect cows against this and other *C. pyogenes* diseases. In all cases of pyometra a little strong iodine may be injected into each horn with or without previous irrigation (50 c.c. of 5 per cent. aqueous iodine into each horn—as recommended by Nielsen[12]). Catarrhal endometritis or pyometra due to trichomonads can be treated in the same way as when these conditions are due to other causes. Gould[13] has recommended the irrigation of the uterus with 3 per cent. lactic acid but according to Tutt[14] this seems to harden the uterine wall. All cases of catarrhal endometritis and pyometra should, of course, be isolated until all discharges have ceased. In the case of trichomoniasis a fresh bull should be used for the healthy cows. The cows which have been and are affected should remain segregated and the bull's sheath should be flushed out with 5 per cent. lactic acid after serving any of the infected group. It should be noted that often when a cow aborts expelling a tiny foetus with the membranes intact, that cow will often come into oestrus within three weeks and will conceive then and eventually calve down normally. It is interesting to compare this observation with Nielsen's statement on contagious abortion which has been mentioned earlier.

In all cases of pus in the uterus, any corpora lutea present in the ovaries are expressed if possible. This operation should always be done with care as fatalities sometimes result from internal haemorrhage from the ovaries afterwards. As a safeguard the ovary should be lightly grasped for a minute or so to arrest haemorrhage. In all cases in which iodine lavage is adopted, the cow should not be bulled the very next oestrus, even if she appears normal. She should miss the first and be served at the second oestrus.

Before dealing with the Fallopian tubes and ovaries, it is important to consider conditions of the cervix and vagina.

Cervicitis is caused by injury at parturition which is usually accompanied by abrasion of the cervical mucosa and subsequent infection, particularly from a uterine discharge. A similar sequence may follow abrasion due to rough handling of the catheter when dealing with a pyometra case. It is for this reason that I dispense with the use of vulcellum forceps, particularly in *C. pyogenes* infection. When using these forceps there is always a puncture of the mucosa and should the forceps tear away there is a larger portal of entry for bacteria.

There is usually enlargement of the cervix in varying degrees. This enlargement may be so great as to prevent the hand being passed sufficiently far forward in the rectum to make a proper examination of the uterine horns. Infection may spread through the wall of the cervix which contracts adhesions with the rectum. Finally, an abscess forms in the rectal wall and ruptures into the lumen of the rectum. From such an abscess accompanying *C. pyogenes* cases we have isolated the same organism (as one might expect). Cervicitis and parametritis are common sequelae of *C. pyogenes* uterine infection. When the rectal abscess ruptures it clears up. Of course, it must be appreciated that this is not a case of fistula as the cervical end of the tract is healed long before

the pus bursts into the rectum. When the cervicitis is acute, folds of cervical mucosa may be seen protruding from the *os* when examination is made with a speculum and electric light. On no account should forceps be used for this examination.

Cervicitis, whilst acute, interferes with conception owing to the swelling and occlusion of the cervical canal in addition to spermatolysis resulting from inflammatory exudate. Later, chronic cervicitis with resulting fibrosis causes constriction which prevents passage of spermatozoa. Should conception occur, then there is always the possibility that the cervix will not dilate sufficiently to allow passage of the calf at parturition.

In acute cases of cervicitis there should be little interference. The *os* may be painted with weak iodine but no attempt should be made to pass the catheter in order to remove any pus which may be collecting in the uterine horns. This procedure should be reserved until the acute symptoms have subsided.

In the more chronic forms of the condition, if pus is present in the body of the uterus, the latter should be irrigated with weak aqueous iodine solution (not stronger than 0·2 per cent.). Some of this iodine will be ejected through the cervical canal and will then paint the cervical mucosa.

In addition to inflammatory changes in the cervix, congenital or other anatomical maliformations are occasionally encountered which may necessitate artificial insemination.

The Vagina

Conception may be rendered impossible by such abnormalities as ballooned vagina, large cysts in the mucosa or persistent hymen (white heifer disease), etc. These cases should be treated on their merits. Ballooned vagina might necessitate artificial insemination, cysts and persistent hymen can be dealt with surgically although in the latter case the prognosis is very unfavourable.

Inflammation of the vagina can be due to a number of causes :—

1. Coital exanthema.
2. Trichomoniasis.
3. Secondary to purulent endometritis.
4. Infection due to vaginal examination when insufficient care is taken regarding the cleanliness of the hand. Similar infection may follow interference at calving.
5. Contagious granular vaginitis.

Coital exanthema—or bull burn—is transmitted by service and is probably due to a filterable virus. The cow shows uneasiness during micturition which is frequent. The tail is held high and there may be varying amounts of glairy discharge. Examination reveals that the vaginal mucous membrane is very congested. Vesicles appear and may attain the size of a pea ; these become pustules and rupture. If there is no secondary infection, the condition will clear up in two or three weeks. During an attack there are very few constitutional symptoms ; the milk may be reduced in amount ; the cow will not conceive probably because the sperms are destroyed —spermatolysis again being due to inflammatory exudate.

The bull shows similar discomfort during urination and the tuft of hairs on the end of the sheath may be matted ; the penis is congested and covered with lesions similar to those in the cow's vagina. There may be paraphimosis.

Trichomoniasis will lead to vaginitis, both soon after service and later when there is a uterine discharge. Examination of vaginal material will frequently reveal the parasites in large numbers.

Contagious Granular Vaginitis.—For some years now, there has been much controversy as to whether this is really a disease or not. Many cows, when examined, show granules in the vaginal mucosa but no other untoward symptoms. However, other cases are encountered, particularly in Shropshire, Cheshire and the Eastern Counties, where there is definitely a vaginitis associated with these granules which are small, hard and quite different from the vesicles seen in bull burn. Again the cows and bull show great uneasiness particularly just after micturition. The lesions are found in the bull's penis. This disease also is spread by coitus and great difficulty is experienced in getting the females into calf. The cause is not known but *Streptococcus viridans* has been implicated.

Cows or heifers suffering from any form of vaginitis should be segregated if possible and should not be served until all symptoms have subsided. Clean cows should be served only by a bull free from any form of balanitis and which has not been used on infected cows.

In all cases of vaginitis the treatment is similar. The vagina can be irrigated with iodine 1 : 1,000, entozon 1 : 1,000, zinc sulphocarbolate (1 per cent.). Entozon pessaries or protargol sticks can be rubbed on the vaginal mucosa. In the case of trichomoniasis the vagina can be douched with 3 per cent. lactic acid. In those cases where the vaginitis is secondary to uterine infection the endometritis should be treated with iodine and as the latter is expelled through the vagina the vaginal mucosa is flushed with iodine.

Vaginitis in any form is liable to prevent conception due to the destruction of spermatozoa in the acid medium produced. When the symptoms have subsided, the vagina can be douched with a sodium bicarbonate solution followed by normal saline before service.

The Fallopian Tubes

Salpingitis or inflammation of the Fallopian tubes is usually associated with pyometra and in practically all cases it is bilateral. Such cases are hopeless. Rarely, salpingitis is unilateral and then if the ovary on the unaffected side is normal the ovum can be fertilised. With a little experience, salpingitis is easily recognisable on rectal examination. In the normal animal (as stated by Tutt[15]) the Fallopian tube is only with great difficulty traced from its fimbriated end to its entrance into the uterine horn, whereas when salpingitis exists the oviduct is swollen, hard, is easily traced from beginning to end, and frequently there are adhesions restricting the extent to which the ovary can be moved. No treatment is of much use but in unilateral cases, ovariectomy on the affected side may be considered.

Salpingitis can be tuberculous in origin and in such cases nodules are felt along the course of an enlarged and hardened Fallopian tube, and the infection has usually spread from a tuberculous peritonitis.

The Ovaries

These are probably second only to the uterus in the number of cases in which they show abnormalities which are linked up with sterility. In countries notorious for deficiency diseases, *e.g.*, New Zealand and Switzerland, sterility due to ovarian trouble exceeds that due to endometritis.

These organs form an integral part of the endocrine system and consequently any hormone derangement is liable to be manifested in the ovarian phenomena. They appear to be affected when the animal is fed on a deficient or too forcing diet. In the latter case, as experience has shown, trouble has been encountered in cows which have been given a ration consisting largely of brewers' grains. Again, there is no doubt that high milk yields at any rate indirectly affect the ovaries adversely. These various factors—hormone deficiency, incorrect diet and high milk yield—are undoubtedly closely inter-related.

Inflammation of the ovary (oöphoritis) can be due to bacterial invasion, *e.g.*, spread from tuberculous peritonitis, but more commonly it is present as the result of rough manipulation of the ovaries, when attempts are made to express corpora lutea or rupture cysts. Such injury might result in a fibrosed ovary in which no Graafian follicles develop, or if they do develop they fail to rupture spontaneously due to increased fibrosis of the tunica albuginea.

Cystic ovaries, as stated by Nielsen[16] and Tutt[17], are often associated with endometritis. These cysts are follicles which have failed to rupture and have undergone degeneration. By rectal examination alone it is impossible to differentiate between cysts and normal Graafian follicles unless one or more of the former are of enormous size. There is no doubt that Hess[18] was wrong when he said that anything over 1·5 cm. in diameter was a cyst. Graafian follicles may be larger and cysts smaller than that. In diagnosing cystic ovaries the clinician must be guided by external symptoms. There can be no doubt if the animal is a typical nymphomaniac which has shown irregular oestrus and is now permanently on heat, together with the fact that the pelvic ligaments are relaxed and the tail is carried high. (In such cases both uterine horns show endometritis and are more or less straight and slack, *i.e.*, they do not contract. The ovarian fossa is enlarged.) It must be remembered, however, that the external symptoms do not appear until the case is of long standing. Further to complicate the issue it must be appreciated that similar symptoms are seen in a few cases where no cysts are palpable *per rectum*. In the true cases of nymphomania, fractures—particularly of the pelvis—are liable to occur owing to loss of calcium and the fact that the animal might slip whilst mounting other cows.

In treating such cases, the cysts should be ruptured *per rectum*, if possible, failing which a trocar and cannula must be used *per vaginam*. This "cysting" should be done as frequently as possible. Any endometritis present must, of course, be attended to. Such animals should be removed from the herd as they are liable to have an adverse effect on the other cows. In all cases of cystic ovaries the prognosis should be guarded, particularly after the onset of nymphomaniacal symptoms.

Persistent Corpus Luteum.—The cause is obscure. When this condition exists there is usually an absence of oestrus. In many cases the cow is not bulled soon after calving and then she does not come bulling. Rectal examination reveals a corpus luteum which should be expressed if possible. (If it has been present for some months enucleation may be impossible.) The animal should come on heat within one week, although the external signs may not be very obvious and consequently the cow may be missed until the succeeding heat. This condition of persistent corpus luteum is often encountered in heifers particularly of the Channel Island breeds, but more about this will be said later.

Cystic degeneration of the corpora lutea may occur as a sequel to uterine infection and is accompanied by irregular oestrus. Cysts should be ruptured, the remaining luteal tissue expressed and uterine treatment adopted.

"Silent heat" must be referred to here. It is encountered in animals which are housed and is consequently much more common in winter. Ovulation occurs but is not discernible. Rectal examination reveals that the genital organs are apparently normal and follicles or corpora lutea may be present. The latter should be expressed and the animals should, if possible, be given some green food and exercise and should be tried frequently with the bull.

Incorrect diet as a cause of sterility has briefly been referred to. This can affect breeding in a number of ways :—

1. Mineral or vitamin deficiency may adversely affect the endocrine system.

2. A forcing diet may stimulate large milk yields, at the same time throwing heavy strain on the anterior pituitary gland so that the latter does not influence the oestral cycle as it should.

3. Diet may over fatten animals but it must be clearly understood that in some cases obesity and sterility are probably both due to the same cause—probably ovarian disease.

It has already been said that diet and hormones are closely linked. L. P. Pugh[19] has pointed out the necessity of minerals for fertility and stressed the importance of a knowledge of the local geological conditions when tackling cases of sterility. He records reduced breeding difficulties when cows are moved on to a chalky subsoil.

Sterility in heifers has been referred to. This form of disease is rarely associated with brucellosis and constitutes the majority of cases which are not indirectly due to that organism. Either the heifers never come bulling or else they are bulled but do not settle. This trouble is chiefly encountered in the Channel Island breeds—particularly Guernseys—but there is evidence of its occurring in other breeds. In most cases there would appear to be a mineral or vitamin deficiency of some kind. A number of these cases are encountered when the animals are on poor pasture. In these cases (of both types) corpora lutea are often present, and should be expressed if pregnancy has been excluded. In those cases which do not come bulling 125 c.c. of 1 : 500 aqueous iodine solution injected into each horn will stimulate the onset of the oestral cycle. I have a record of a bunch of 50 Guernsey heifers which did not come into service, and after being treated with iodine, 49 came into oestrus, were served and calved normally.

SUMMARY

1. Sterility probably causes more financial loss than any other disease encountered in dairy herds.

2. The amount of infertility in bulls in this country is much less than on the Continent.

3. Endometritis in one form or another (and in the majority of cases secondary to brucellosis) is responsible for most cases of bovine sterility. Such cases should be treated as early as possible. Care should be taken to avoid rough manipulation of the genitalia, and too concentrated solutions of iodine.

4. Ovarian derangements are second only to endometritis in the amount of bovine sterility for which they are responsible in this country. This trouble is commonest in Guernseys. The ovaries are affected by vitamins, minerals, high milk yield and infection elsewhere in the genital tract.

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In conclusion, I should like to acknowledge all the assistance I have received from Dr. A. W. Stableforth.

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Discussion

The President (Mr. A. S. Ferguson) thanked the speaker for his interesting and particularly practical paper, which would most certainly appeal to all practitioners. In that part of Scotland there was a great deal of sterility and contagious abortion. He considered there was a connection between the two.

As the paper had been a long one there was little time for a discussion, but he hoped all those present would take the opportunity of asking Mr. Hignett questions on any aspect of this particular problem about which they were not clear.

Mr. W. T. Hewetson asked whether salt licks were helpful in preventing retention of the after-birth. In his part of the country he had encountered sterility in a few bulls which responded to treatment with wheat germ oil. What was Mr. Hignett's opinion of this line of treatment?

Mr. Baird explained that the bulls mentioned by Mr. Hewetson were constantly housed, and that would probably explain an absence of sufficient vitamin E.

Mr. G. A. Sangster mentioned that he had been very interested in what used to be the regular procedure followed by the late Mr. James B. Taylor, Dumfries. In cases of retention of the placenta, Mr. Taylor removed all foetal membranes as soon after the act of calving as possible and if possible within 12 to 24 hours. In carrying out their removal Mr. Taylor broke down the cotyledons, and while there was, in many cases, considerable haemorrhage, the results appeared very satisfactory and the early treatment was recognised and appreciated by Mr. Taylor's clients.

Mr. A. Young expressed the view that in most cases foetal membranes should be removed at five or six days.

Mr. F. A. Gordon spoke of a case where a local veterinary surgeon had a new assistant who had been cleansing cows for seven months by forcibly removing the cotyledons before the principal discovered what was happening. Observation was kept on these cows and they all conceived normally. He (Mr. Gordon) would like to know the earliest date at which pregnancy in the cow could be diagnosed by rectal examination.

Mr. A. B. Kerr thanked the essayist for his excellent paper which must have necessitated a great deal of work. He was particularly interested in the statement that in simple chronic endometritis the iodine was being used as a stimulant: he had always thought of it being used as a bactericide. He and Professor Mitchell had worked with Professor Folmer Nielsen and later they had used iodine with great success. Thinking they could improve on this treatment they had tried various non-irritant antiseptics in uterine lavage. The results had been very disappointing, and this he considered supported Mr. Hignett's theory. He asked if the speaker was always satisfied about Nielsen's Endometritis I. He had, as he mentioned, worked with Nielsen and he was doubtful in a number of cases as to whether any endometritis existed in these particular cases.

The Reply

Mr. Hignett, replying, thanked the meeting for the way in which his paper had been received. In answer to Mr. Sangster he said that in his opinion foetal membranes should be removed by the third day. He was very interested to hear what Messrs. Sangster and Gordon had to say about removing the cotyledons. It was an established fact that extra cotyledons were formed during pregnancy.

In reply to Mr. Gordon, he could diagnose pregnancy at five to six weeks in a high percentage of cases. T. G. Murray could diagnose pregnancy in heifers at four weeks in many cases.

Mr. Baird had already answered Mr. Hewetson's question regarding vitamin E in the treatment of sterility in bulls. He (Mr. Hignett) was very doubtful if vitamin E deficiency occurred in cattle. It was just possible it might occur in these bulls or in any cattle that were housed all the time.

There was some evidence that where cattle were supplied with salt licks there did tend to be a reduction in the number of cows which retained their foetal membranes.

He was very pleased to think he had cleared up a point that had puzzled Mr. Kerr. He was referring to the use of iodine as a stimulant and not as a bactericide. With regard to Mr. Kerr's question concerning simple endometritis there was no doubt that many cases of ovarian sterility were wrongly diagnosed as simple endometritis. On the other hand, many people manipulated the ovaries when the actual trouble was in the body of the uterus.

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Later Mr. Hignett demonstrated the various instruments he uses in sterility work. He also showed drop preparations of cultures of trichomonads under the microscope.

"Fears have been expressed by farmers that uneven distribution of slaughterhouses might cause slaughtering arrangements to be inadequate during summer weather," observes the Agricultural Correspondent of *The Daily Telegraph* in a recent issue, and continues: "I understand that a detailed survey of abattoirs has been conducted by Ministry of Food experts, and that in some cases their recommendations have been adopted. Other improvements are also being made. The Ministry is satisfied that these improvements will ensure that meat is well hung and properly chilled during the summer. Allocation of slaughterhouses and suggestions for improving their distribution are to be considered by 50 tribunals covering the whole of England and Wales."

THE VETERINARY RECORD
May 11th, 1940.

BOVINE STERILITY

STERILITY in dairy herds, by delaying conception and the succession of lactation periods, has come to be known as one of the most serious sources of loss of milk in dairy herds. It is naturally expected by the farmer that a dairy cow will produce a calf every twelve months, and that the period when the cow is not lactating will be comparatively short. But when a considerable percentage of the cows cannot be got in calf for long periods the production of milk ceases to be a profitable undertaking. That this is a serious menace to the dairying industry is indicated by the statistics given in the paper by Mr. Hignett, published in this issue.

The additional failure to produce a calf yearly is also a very important matter, particularly in the high grade herds, and in herds where reliance is placed on the provision of home-bred calves to fill the vacancies which occur from time to time.

Unfortunately, the problem has no single solution and Mr. Hignett has indeed shown what a great variety of factors may play a part in its etiology. The study of bovine sterility is now making progress and our knowledge of the factors concerned is increasing, this being dependent upon work in several collateral branches of science. Although some of the opinions expressed are somewhat controversial, they bear the stamp of close personal observation.

During the past few years much information has been made available regarding trichomoniasis in cattle and its bearing upon sterility. The clinical features associated with this infection are now well known, but there is considerable danger that these features may be completely relied upon for diagnostic purposes. It cannot, however, be too strongly emphasised that a definite diagnosis should be avoided until the mobile trichomonads have been recognised by microscopic examination. That is all the more necessary in view of the experience of the author in outbreaks which he has been able to connect with corynebacterial infection. It is well known that abortion and pyometra have been caused at times by infection with *C. pyogenes* and the facts given in this paper suggest that more care must be taken in the examination of material from suspicious cases.

The experiment planned for the testing of toxoid in the treatment of this infection should give reliable information as to its value and exclude the possibility of coincidence interfering with the interpretation of results.

Another valuable piece of information given refers to a type of what might be called "functional sterility" which appears to be common in Guernsey heifers where there is an absence of oestrus. The intra-uterine injections of iodine solutions seem to have had the desired effect in bringing about the appearance of oestrous cycle followed by conception after service.

It may be added that the successful control of sterility as in other affections is favourably influenced by early attention. Frequently no serious attempt is made to ascertain the cause of the trouble until a period of six months or more has elapsed. Time is an important factor in the effort to control and overcome the genital trouble or remove any other agency which is interfering with conception.

CLINICAL COMMUNICATION

Tetanus in a Cow

F. HEBELER*
Royal (Dick) Veterinary College

Subject.—Shorthorn cow, six years old.

History.—This cow had calved normally on March 8th, but had retained her foetal membranes, some of which hung out of the vulva. A week later part of these membranes broke off and the remainder slipped back into the uterus. Advice was called on March 19th as the animal did not seem to be doing well and had a uterine discharge. On vaginal examination the cervix was found to be partially closed, but some membrane was removed and the uterus douched with a 1 : 1,000 solution of acriflavine. It was evident that a certain degree of metritis was present.

Symptoms.—The animal was not eating well and, on examination of the mouth, the jaws were found to be partially locked; constipation was marked. The nostrils were fixedly dilated and the nose covered with dry scales. Temperature was normal but respirations were rather hurried and shallow. When the head was raised or the chin tapped the nictitating membrane "flicked" across the eye in typical fashion. The gait was stiff and the neck muscles hard and rigid so that the head stuck out stiffly. Milk secretion was not much reduced, the calf appearing well fed. There was no evidence of muscular spasm or hypersensitivity.

Treatment.—Owing to the early onset of severe symptoms serum treatment was not considered to be economic. A large dose of a saturated solution of magnesium sulphate was injected subcutaneously and simple laxatives were given in gruel.

Next day she became extremely tympanitic; this was relieved with the trocar and cannula. All the symptoms were much worse, trismus was complete, and she appeared to have very great difficulty in swallowing fluids. There was still no hypersensitivity. As the cow was unable to eat or drink it was impossible to attempt further treatment and she was slaughtered.

Post-mortem Examination.—Apart from a localised metro-peritonitis the only gross lesion was dilatation of the heart which was engorged with blood. There was little or no sign of fever in the flesh.

This case was thought to be of interest owing to the comparative rarity of occurrence of tetanus in bovines; also, although the symptoms were unmistakable and severe, it was unusual that there was no rise in temperature or hypersensitivity with muscular spasms.

*Final Year Student. Record of case seen in pupilage with Mr. C. S. Grunsell, M.R.C.V.S., of Glastonbury.

ABSTRACTS

[INFECTION OF A BOVINE BY HUMAN TYPE MYCOBACTERIUM TUBERCULOSIS. Reid, J. (1939.) *J. comp. Path.* **52**. 318-321.]

Two instances, only, of infection of bovines by tubercle bacillus of human type have hitherto been recorded in Great Britain ; both by Griffith (A. S.) who found human type infection in the mesenteric gland of a calf which had received milk from an animal vaccinated with human tubercle bacilli, and, in a second case, in the lung lesions of a calf which had had contact with a phthisical person.

Since the Attested Herds Scheme was introduced by the Ministry of Agriculture, it has been the practice to purchase for special investigation a number of animals which give anomalous results in official herd test in the field. In April, 1936, at a field test, a 15-months-old Guernsey heifer gave varying reactions in the double intradermal neck, caudal fold, and vulva tests, which were carried out simultaneously. The heifer was slaughtered and subjected to a careful *post-mortem* examination. No macroscopic lesions of tuberculosis could be detected in any organ or lymphatic gland. Suspensions were prepared from various gland groups, which were inoculated into guinea-pigs, rabbits and tuberculin-tested fowls. Material from positive guinea-pigs, *i.e.*, those inoculated with material from parotid, pharyngeal and submaxillary gland, was seeded on to potato and egg media with and without the addition of glycerin. The resulting growth was suggestive of human type bacilli. Rabbits, guinea-pigs, two young goats and two calves were inoculated with stated amounts of weighed dry cultures. On *post-mortem* examination both calves showed non-progressive localised lesions. The results of the cultural and quantitative biological tests were in accordance with the reactions associated by Griffith (A. S.) with the human type of *Mycobacterium tuberculosis*. Attempts were made to trace contact between the Guernsey heifer and a case of open tuberculosis without success.

L. E. W. B.

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[I.—THE SULPHANILAMIDE TREATMENT OF GUINEA-PIGS INFECTED WITH *BR. ABORTUS*. Wilson, G. S., and Maier, I. (1940.) *Brit. Med. J.*, Jan. 7th, p. 8.

II.—TREATMENT WITH SULPHAPYRIDINE (M & B 693) OF GUINEA-PIGS INFECTED WITH *BR. ABORTUS*. Wilson, G. S., and Maier, I. (1940.) *Ibid.*, Jan. 13th, p. 47.]

I. Groups of 300 to 400 gramme guinea-pigs infected three to 17 days with a virulent strain of *Br. abortus* were treated daily for five or ten days with 100 or 150 mgm. sulphanilamide. When these guinea-pigs were killed and examined a few days later it was found that on the whole the lesions were less severe in the treated than in the control animals, and the number of colonies obtained from the spleens and sub-lumbar glands was distinctly less, especially in those animals receiving the higher dose. Nevertheless in no animal was a complete bacteriological cure obtained.

In a second experiment, groups of guinea-pigs infected for seven weeks were treated with 200 or 400 mgm. sulphanilamide daily for two to five weeks. Again the lesions were less severe in the treated than in the control animals. Further animals receiving 400 mgm. sulphanilamide daily for three or more weeks were culturally sterile.

It is concluded that sulphanilamide treatment favours the destruction of *Br. abortus* in the tissues but that to be successful the drug must be given daily for some weeks in doses bordering on the toxic limit.

II. It is claimed that M & B 693 is less toxic than sulphanilamide. It seemed desirable therefore that its curative action on *Br. abortus* infection should be tested in view of the moderately successful results obtained with sulphanilamide. Accordingly experiments similar in outline to those reported in the first paper were repeated, using M & B 693. The final results as regards cure were much the same, *i.e.*, only doses bordering on the toxic limit and given daily for four to six weeks effected a cure. The authors emphasise, however, that, contrary to expectation, M & B 693 was more toxic for guinea-pigs than sulphanilamide, several experimental animals dying, showing paresis or manifesting general loss of condition.

F. W. P.

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[DISEASES OF CATTLE DUE TO FOREIGN BODIES. (Trans. title.) Leue, E. (1939.) *Deuts. tierärztl. Wschr.* **47**. 489-496.]

The author mentions the serious economic loss due to cattle having to be slaughtered in cases of foreign bodies in the reticulum, traumatic pericarditis, etc., and discusses the operations for removal. From 135 operations performed for the removal of foreign bodies, with only ten fatalities, the author concludes that the ventral site is best. He operates just over the xiphoid cartilage in the middle line, making an incision just large enough to enable the hand to be inserted through in a backward direction. The cartilage is pressed downwards and the peritoneum pierced carefully, so as to avoid tearing it away from the abdominal muscles and thus leaving a " pocket " for infection. When the operator's hand is withdrawn from the abdominal cavity the xiphoid cartilage falls into place once more. The wound is not completely sutured, and a sterile knotted handkerchief is placed in position to facilitate drainage, one knotted end being inside the cavity and the other outside. Chloral hydrate is used for anaesthesia. The author gives a list of some of the foreign bodies removed ; they include nails and pieces of wire.

D. J. A.

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[TORSION OF THE UTERUS IN THE COW. Tischlauser, L. A. (1939.) *N. Amer. Vet.* **20**. 35.]

The author prefers a surgical intervention, and proceeds by a flank operation on the side towards which torsion has occurred. The skin is cleansed with petrol followed by soap and water. Anaesthesia comprises a local along the line of incision, together with epidural anaesthesia. The skin is incised and the muscle separated with the fingers sufficiently to allow free passage of the arm. The peritoneum is pierced, and the arm passed as far round the ventral surface of the uterus as possible. The uterus is then tipped over with a lifting and rolling motion. Where torsion is severe or of long standing, distension of the uterus may cause difficulty. The skin only is sutured and delivery of the calf effected 24 hours later if it has not occurred spontaneously.

G. V. L.

[CONTROL OF HAEMORRHAGE BY THE INTRAVENOUS USE OF OXALIC ACID. Davies, A. A. (1939.) *J. Amer. Vet. Med. Assoc.* **95.** 510-511.]

Experimental evidence has shown that, both in man and in animals, oxalic acid on account of its coagulative properties, given intravenously, is useful in the control of haemorrhage, accidental or surgical.

The author has had success with its use in the treatment of dogs ostensibly suffering from internal haemorrhage as a sequel to car accidents.

Six dogs with blanched mucous membranes, weak rapid pulse and gasping respirations, all recovered completely. Six others that had met a similar fate but exhibited less constitutional disturbance were treated with " commercial coagulants," and of these, five died from internal haemorrhage whilst the sixth recovered.

Intravenous injection of 1 grain oxalic acid in 5 c.c. of water before operation rendered the removal of mammary neoplasms practically bloodless.

One dog, when given ½ grain of oxalic acid prior to amputation of a leg, was found to require only about half the normal amount of nembutal to produce anaesthesia.

Dosage of oxalic acid varies from ½ to 1 grain for dogs weighing from 25 to 50 lb. It should be given in a dilute solution and injected very slowly. The toxic dose for a 25 lb. dog was found to be 10 grains and for a 1,000 lb. mule 160 grains.

When oxalic acid is used in combination with general anaesthesia there is a tendency for alarming cyanosis to occur, but animals recover.

C. F.

* * * * *

[NEWER RESEARCHES REGARDING TROPICAL AND SUB-TOPICAL DISEASES. Kelser, R. A. (1939.) *Vet. Bull. U.S. Army.* **33.** 339-354 (13 refs.).]

The results of researches on murrina, Chagas' disease, equine degenerative arthritis, and equine encephalomyelitis, are recorded.

In acute cases of murrina direct microscopic examination of wet or stained blood preparations usually reveals the trypanosome. In chronic cases, however, and in carriers (especially cattle), the parasite is difficult to demonstrate. In these cases the complement-fixation test is especially valuable. The technique is essentially similar to that employed for dourine and surra. It has been found that in the preparation of the antigen equally good results are obtained with *T. hippicum* and *T. equiperdum*. Since the latter is considerably less virulent for the white rat it is usually employed. Best results in practice are given with antigens used four to five days after preparation. Much publicity has been accorded the finding that the vampire bat (*Desmodus rotundus*) is an active vector of murrina in Panama. Although this animal can and does transmit the disease, the chief vectors are biting flies.

The diagnosis of Chagas' disease is difficult since trypanosomes occur in the circulation spasmodically, and then only in small numbers. Till recently very irregular results have been given by the complement-fixation test, due to marked variations in potency of the antigens employed. The author has perfected a method of mass propagation of *T. cruzi* in artificial culture, and prepared a very satisfactory antigen. The trypanosomes are grown in 50 c.c. Erlenmeyer flasks containing a high peptone content blood agar covered with several c.c. of two parts peptone broth and one part of 1 per cent. dextrose. No difficulty has been encountered in maintaining the culture, and numerous sub-cultures have been made. Excellent results have followed the use of the antigen so prepared.

Physical surveys of army horses in Panama from time to time have shown a high incidence of variable lameness. The " shifting type " of lameness appears to be particularly prevalent. Autopsy shows degenerative changes in the articular cartilages consisting of erosions, fibrillation, grooving, etc. In all, 54 autopsies have been made. The condition appears to be a degenerative arthritis basically confined to the articular cartilages. Bone changes, when present, are always secondary to cartilage lesions. Osteomalacia is not a basic factor. The condition has appeared in horses of all ages, and seems identical with that described by Mitchell (*Vet. Rec.* **47.** Dec. 14th, etc.). Investigations have revealed that in Panama the ration for army horses provides a low calcium, high phosphorus balance. The total calcium figure is also low. Adjustment has been made by feeding alfalfa-hay, but it is too early yet to assess the value of this action. Autopsy material from 60 human cases of degenerative arthritis has been studied. A close analogy can be drawn between the conditions in equines and in man.

The author recorded the first proved case of equine encephalomyelitis in Panama in July, 1936. The virus was of the eastern type. Attempts to discover the mosquito vector have so far been unsuccessful.

D. D. O.

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[STUDIES ON CERTAIN FILTRABLE VIRUSES. II.—IMMUNISATION AGAINST FOWL-POX WITH FOWL- AND PIGEON-POX VIRUSES CULTIVATED IN VIVO AND IN VITRO. Brandly, C. A., and Dunlap, G. L. (1939.) *J. Amer. Vet. Med. Assoc.* **95.** 340.]

The authors object to the use of fowl-pox virus collected from skin lesions as a vaccine against fowl-pox, as it gives rise to too great systemic disturbance and a high mortality in vaccinated birds. Pigeon-pox vaccine, on the other hand, does not in their opinion produce a reliable solid and lasting immunity. Further objections to these forms of vaccine are the bacterial and virus contaminants which may be present in the skin lesions in which the virus is collected. Fowl-pox virus can be cultivated successfully in tissue cultures and on the chorio-allantoic membrane of the chick embryo. The yield from tissue cultures is not sufficiently good to justify the troublesome technique involved, but the growth in eggs is very satisfactory, the virus being obtained in higher concentration than from skin lesions. Virus carried through 68 passages in eggs over a period of almost two years did not lose its virulence for chicks, and proved an efficient immunising agent. The cutaneous route of administration is preferred to the intramuscular, as fewer secondary lesions arise and the dosage of virus required is smaller.

J. B. B.

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[THE VIABILITY AND IMMUNISING VALUE OF EGG-PROPAGATED LARYNGOTRACHEITIS VIRUS. Beaudette, F. R., and Hudson, C. B. (1939.) *J. Amer. Vet. Med. Assoc.* **95.** 333.]

The use of virus collected from artificially produced cases of laryngotracheitis as a vaccine for immunisation

of fowls by intracloacal inoculation may be dangerous, as other infective agents may be present along with the virus in the tracheal exudate collected, and infect vaccinated birds, even by the cloacal route. Virus grown on the chorio-allantoic membrane of the developing chick is free from this objection, and, since previous work had shown that egg-passage did not alter the immunising value of the virus, experiments were made to ascertain the effect of drying and storing such virus. Vaccines were prepared from virus passaged for 10 and 25 generations in eggs, and stored dry for periods up to 421 days. Laboratory tests of this material showed that the potency was well maintained, a high percentage of " takes " and subsequent production of immunity being found even after administration of the vaccine in dilution of 1 mg. per c.c. of 50 per cent. glycerine. The 25th generation virus was tested in greater dilutions, but the smaller doses were of doubtful protective effect. Field trials on 5,000 birds bore out the laboratory findings.

J. B. B.

REPORT

[CITY OF JOHANNESBURG. Report of the Director of Abattoir and Livestock Market Department, July 1st, 1938, to June 30th, 1939.]

This report is the first under the name of the new Director, Mr. A. C. Kirkpatrick, who succeeded Colonel Irvine Smith, on the latter's retirement in August, 1939. During the year 853,771 animals were slaughtered in the abattoirs, this being over 40,000 more than in the previous year, and 1,485,545 animals passed through the livestock markets, or over 97,000 more than the year before. There are 1,568 mules, 80 horses, and 310 oxen in the service of the Municipal authority. A severe horse sickness season was experienced in most parts of the Union owing to a heavy and late rainfall. Some 200 new animals were acquired and old and unfit animals were destroyed. Zoo animals were treated and 2,357 autopsies performed. Visits were paid to 335 dairies and 15,151 cows were inspected for tuberculosis, 250 milk samples being taken for examination; 15 cases of open tuberculosis were detected clinically. Two milk samples from tuberculous udders have been kept at the laboratory at refrigeration temperature (32° F.) for 365 days and for 381 days. In both cases the organisms were found to be still viable, and extensive tuberculosis was produced in laboratory animals by intraperitoneal injection of 0·5 c.c. of the milk sample.

Microscopic examination of blood smears was carried out in 1,548 cases and anthrax was discovered in eight. Bruising accounts for much of the beef condemned, and caseous lymphadenitis and emaciation account for much of the mutton condemnation. Bruising, emaciation and jaundice lead as causes of veal condemnation, and for pork destroyed, cysticerci, bruising, sarcocysts, abscesses and tuberculosis account for the bulk of carcases.

The report is a very creditable document, and your readers will wish the new Director and his assistants every success in the future.

D. J. A.

A small increase in the membership of the National Pony Society is reported for 1940, from 564 to 585. The forthcoming volume and supplement of the Stud Book will contain an entry of 1,057, the largest since 1927.

REVIEW

[PRACTICAL VETERINARY PHARMACOLOGY, MATERIA MEDICA AND THERAPEUTICS. H. J. Milks. [4th Edition.]. Pp. 620. Price 35/-. (Baillière, Tindall & Cox.).]

The appearance of a further edition three years after the third, is an indication that this work has served its purposes.

This fourth edition contains additions, and appears to be thoroughly up-to-date. Incidentally, the author sets an example of concision that other authors of works on Materia Medica might note. The chapter by Dr. Adolph Eichhorn has likewise been brought up-to-date in equally satisfactory fashion.

We recommend this as an excellent addition to the surgery book shelf and for the use of students.

SILAGE

Farmers now realise that they must produce more fodder from their own soil for next winter. In a recent interesting broadcast discussion it was pointed out that the main reason why ensilage is not more popular is that it got a bad name in the past. New methods of making silage have been perfected recently. It is now within any farmer's capacity to make—quite cheaply—a high quality silage that will replace a proportion of cake in the ration. Such silage can be made from young leafy grass, or from early cuts of lucerne or clover, or from mixtures of oats and vetches, peas and beans, or maize. Cheap portable silos are now on the market and molasses is added to the material during filling. These are especially suitable for the ensiling of young, leafy grass, and silage so made may be enough to carry stock through the winter. Steps have been taken by the Ministry to ensure supplies of these cheap portable silos this season. Good silage can also be made in pits or clamps. Arrangements have been made for farmers to get adequate supplies of molasses for silage making. All the farmer has to do is to apply to his War Agricultural Executive Committee for a permit, if he wants more than one barrel—about 40 gallons. He will then be able to obtain the molasses through his usual supplier.

Molasses must be added to protein-rich material, such as young grass. If this is done, and the simple rules of silage making are carefully followed, a good quality silage will result. Half-made, badly weathered hay will make poor silage as it would have made poor hay. To get good stuff out of the silo, good stuff must be put in.

It is important to appreciate that hay and silage are not competitive. The ideal programme is to make high-quality silage in portable silos from young grass or crops in the spring, and again from good aftermath in the autumn, while making hay in the usual way in June and July. Any mature grass that cannot be made into hay during these months, owing to wet weather, can be converted into stack silage. This is less valuable material than that made in a structural silo, but is more cheaply made, and is certainly better than bad hay.

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Arrangements have now been made to provide a market for all the linseed which farmers grow this season. The Ministry of Food will purchase linseed which is surplus to farmers' requirements for stock feeding. The price to be paid for good sound seed will be the market price of imported linseed in this country next autumn. Growers will also have the option of obtaining 10 cwt. of linseed cake for each ton of linseed delivered.

N.V.M.A. DIVISIONAL REPORTS

ROYAL COUNTIES V.M.A.*

ANNUAL MEETING AT READING

The annual general meeting of the Royal Counties Veterinary Medical Association was held on January 26th, 1940, at the Caversham Bridge Hotel, Reading. There were present the following: Messrs. S. Guy Anderson, J. R. Baxter, J. Bell, H. Bell, Esmond Brown, R. R. Bugg, Professor J. B. Buxton, Messrs. R. M. Davidson, G. W. Dunkin, Edwards, Dr. A. C. Fraser, Messrs. R. and G. Hancock, Tom Lepper, G. P. Male, N. P. Male, Lt.-Colonel P. J. Simpson and Professor G. H. Wooldridge. Miss K. A. Baxter and Mr. T. J. Bosworth were present as visitors.

Death of the President

The chair was taken by Colonel Simpson who, at the outset, said that they were meeting that day under exceptional and tragic circumstances. It was but a few weeks since they had elected their President and on December 28th he was actually coming back to Reading to attend a meeting of this Association when he met with his tragic death. Colonel Simpson said that he did not know that he was capable of dilating on the character of Captain Little; they all knew him and respected him as an old member and associate, and his loss was a blow to all. Captain Little's place had to be filled, however, and the first item on their agenda was the election of a new President. It was with very great pleasure that he proposed that their Senior Vice-President, Mr. J. Bell, be elected to the office of President. They all knew the family of the Bells and he thought he might say that the affairs of the Association would be quite safe in the hands of Mr. J. Bell.

Major G. W. Dunkin seconded the proposition, which was carried with acclamation.

Mr. Bell thereupon took the chair and remarked that whilst the honour which had been accorded him gave him the greatest possible pleasure, he very much regretted that the death of Captain Little under such tragic circumstances necessitated his coming into office sooner than he should have done. He took office with some fears and misgivings when he remembered the previous distinguished Presidents of the Association, but he assured them that he would do all in his power to further the interests of the Association.

The minutes of the previous annual general meeting, having been published in the *Veterinary Record*, were taken as read and signed as correct.

Finance.—The balance sheet was presented by the Treasurer. He reported that the expenses were well within the receipts and he thought that even under war conditions they might expect to be able to keep well within their income, provided subscriptions were forthcoming. They had a balance of about £50, the disposal of which he would like discussed, particularly as charities at that time were very badly hit by war-time conditions.

Dr. Fraser proposed that the Association should give £50 to the Victoria Benevolent Fund but he would like the views of others on the question of a reserve fund.

The Treasurer said they had the equivalent of three years' subscriptions in hand, which should tide them over. He thought that was an adequate reserve.

Mr. G. P. Male said that as a rule they had given a subscription each year to the fund, which was not on the list. Personally he would prefer to give a regular subscription to the fund upon which they could depend, rather than a lump sum now.

The Treasurer asked if the members wished this subscription also to be given.

Mr. Male added that he knew the fund was much in need of support and a great deal of money was required. Many people should be receiving benefit who were getting only a small sum and he thought it better to give an increased annual subscription. In that way they would be setting a good example to other associations.

The Treasurer thought that the moral effect of handing over their surplus in this manner would set a good example.

Colonel Simpson expressed himself as being in favour of giving as much as possible, but if given as a donation it had to be put on deposit and would only bring in a few shillings a year. On the other hand, lean years might lie ahead of the Association. Could they make it £30 and strike the happy medium? On the other hand they could give £25 this year as a subscription and they might be able to give another £25 next year.

After some further discussion it was proposed by Professor Wooldridge and seconded by Mr. H. Bell that £25 should be invested in War Savings certificates and that £25 should be given to the Victoria Benevolent Fund, and this was carried.

The balance sheet was received and adopted on the proposition of Major Dunkin, seconded by Mr. Male.

Hon. Associateship.—It was proposed by Colonel Simpson and carried with acclamation that Mr. Tom Lepper should be elected to Hon. Associateship.

Mr. Lepper, replying, said that he could not tell them how much he appreciated the great honour they had done him. He did not really think he was worthy of it. He was now 80 years of age and about the oldest member of the Association. He believed he attended the first meeting which was held in that town and together with Colonel Simpson's much esteemed father, Mr. James Simpson, and his brother, Sir Henry Simpson, he had something to do with the formation of the Association. He and his family had been practising in Aylesbury for the last 100 years. He had been President once and read a paper once and he and his brother Harry had had the great pleasure of entertaining some of the members in Aylesbury. Now at his great age he had given up practice and his very good friends Mr. Anderson and Mr. R. R. Bugg, who were there that afternoon, had taken over his practice and he desired to offer them his best wishes for their future prosperity. (Applause.)

Correspondence.—The correspondence included a letter from Captain Little's brother thanking members for their sympathy.

Apologies for inability to be present were read from Messrs. N. S. Barron, J. Bell, H. B. Collet, Dr. Tom Hare, Major W. H. Kirk, Messrs. E. S. Paterson, H. C. Shingler, J. F. D. Tutt, Colonel G. K. Walker and Mr. J. Willett.

A letter dealing with petrol supplies was then read and discussed and it was decided, on the proposition

*Received for publication, April 2nd, 1940.

of the Treasurer, seconded by Major Dunkin, that the expenses of the liaison officer for the Reading area (Mr. G. P. Male) should be defrayed by the Association.

Mr. Male asked for a note to be made of his request that members should not write to him always when requiring petrol. They should write to the District Petroleum Officer in the first place and then if there was any difficulty they should get in touch with him. He asked members to see that the forms were properly filled in and the registration book sent with "Veterinary Surgeon" marked in large letters on the envelope and the divisional number quoted. The application would then go direct to the official who dealt with these applications and delay would be avoided.

It was proposed that the annual subscription of £1 1s. 0d. to the National Horse Association should be repeated and this proposition was carried.

The Secretary announced that the sum of £4 2s. 3d. had been received from the collection box for the Victoria Benevolent Fund.

A letter of resignation from Captain Bullen was read but it was decided to ask him to reconsider his decision.

Membership.—The name of Mrs. Stucky was put forward for election to membership. This lady was unanimously elected subject to the condition that the necessary form of application was filled in.

Colonel Simpson said he would like to propose that any member of the staff of the Royal Veterinary College who was not already a member, and who would like to join while stationed or billeted in or near Reading should be allowed to do so without paying an entrance fee. This proposition was seconded by Mr. Esmond Brown and carried.

Exhibit.—There were no morbid specimens for exhibition but an intradermal needle of a new type sent by Mr. Tutt was examined by members.

Professor Wooldridge gave it as his opinion that the needle was too short and he feared the tuberculin would escape through the short tract.

Mr. Esmond Brown considered that it would be a tricky thing to use, particularly in the hands of the young or inexperienced.

A Member pointed out that it was of course necessary to have a certain amount of track into the skin, otherwise the tuberculin would squirt back.

Mr. G. P. Male said that they owed Mr. Tutt thanks for having provided a subject for discussion and he would not like to condemn the needle without testing it first. Skins varied considerably and he would like to use the needle on Jerseys or Guernseys before passing judgment. It might well be that the needle would prove quite suitable for some breeds and not for others.

A Condition for Discussion.—Mr. H. Bell asked members for their opinions on a type of case seen from time to time of which he had had several lately. It was a condition seen in the dog. Upon casual inspection one was apt to think that it was a case of perineal hernia but a closer examination *per rectum* showed that what appeared to be a hernia was in reality an accumulation of faeces to one side of the rectum to palpate which one's finger had to be inserted into the rectum and turned at right angles.

Professor Wooldridge said that he knew the type of case to which Mr. Bell was referring: he had seen the condition in all types, from Alsatians to Pekingese. There seemed to be little that could be done to restore normality. An operation was not likely to be successful and the only measure of relief that could be adopted was digital, and a supervision of the diet so that the faeces were always kept in a soft condition. He found it difficult to state the cause of the trouble but it had been suggested that it was due to an accumulation of the faeces associated with inflamed anal glands. A difficulty lay in getting the mass out with the fingers. When the dog strained it was in the direction of the centre of the mass.

Election of Vice-President.—The next business before the meeting was the election of Mr. Esmond Brown as Vice-President to take the place of Mr. J. Bell, following which Mr. Bell said that he had not been able to prepare a Presidential address but he wished to make a suggestion. He had noticed that the same people always came to those meetings and some who did not attend put forward the objection that as the paper given was on a large animal subject and they were small animal practitioners, or *vice versa*, they did not think it worth while attending. He thought they might overcome those objections by arranging some kind of questionnaire for the next meeting. The idea would be to get members to describe how they dealt with certain cases—their own methods and why they considered them the best. He went to a refresher course some time ago and was surprised to find how many new ways there were of going about everyday jobs and he thought that some such pooling of ideas on all kinds of subjects might provide a very useful programme.

The members agreed to this suggestion with enthusiasm and it was decided to circulate questions to members and arrange for a discussion on the lines indicated.

Mr. Male added that they might discuss such a subject as the Animals Anaesthetics Act which was very antiquated and contained many discrepancies.

Next Meeting.—It was arranged that the next meeting should be held in Reading on account of the town's central position.

A vote of thanks to Mr. J. Willett for auditing the accounts and to Mr. Bell for his conduct in the chair concluded the meeting.

At the close of the meeting the members and visitors were entertained to tea as the guests of the President.

H. Bell, *Hon. Secretary*.

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DUMFRIES AND GALLOWAY V.M.A.*

SUMMER MEETING AT LOCKERBIE

The summer meeting of the above Division was held in the Lockerbie House Hotel, Lockerbie, on Tuesday, June 13th, 1939, the President Mr. A. S. Ferguson, being in the chair.

The following members were present: Messrs. J. Baird, F. A. Gordon, W. T. Hewetson, A. J. Kennedy, A. B. Kerr, J. A. McKinnon, A. J. Milligan, A. Young and G. A. Sangster (Honorary Secretary). Messrs. S. L. Hignett, E. E. Jelbart and D. C. Scott were present as visitors.

Apologies for absence were received from Messrs. G. D. W. Davidson, I. G. Macmillan, O. Stinson and D. G. Wishart.

The minutes of the last meeting were read and approved.

Election of Members.—Mr. W. A. Ireland, Kirkcudbright, and Mr. J. Baird, Carlisle, nominated at the last meeting, were elected members of the Division.

*Received for publication, March 28th.

Nomination of Member.—Mr. D. C. Scott.

Correspondence.—Letters concerning National A.R.P. Animals Service and other correspondence were read and considered.

Paper.—A paper of outstanding merit on " Bovine Sterility " was read by Mr. S. L. Hignett, B.SC., M.R.C.V.S., Division of Preventive Medicine, the Royal Veterinary College, London. This was followed by an interesting discussion, which owing to lack of time at disposal had, unfortunately, to be cut short. [Mr. Hignett's paper is reproduced, together with a report of the discussion and of the essayist's reply, at the commencement of this issue.—*Editor.*]

At the conclusion of the meeting the gentlemen were joined for lunch by the following ladies: Mrs. A. S. Ferguson, Mrs. A. J. Kennedy, Mrs. A. B. Kerr, Mrs. G. A. Sangster and Mrs. A. Young. Thereafter the afternoon was agreeably spent in the beautiful grounds of Lockerbie House. A clock golf competition in aid of the Victoria Veterinary Benevolent Fund was won by Mrs. Ferguson, the prize being the gift of the President. The party was most hospitably entertained to tea by the President and Mrs. Ferguson and so ended a very enjoyable afternoon.

On the call of the PRESIDENT a vote of thanks was accorded to Mr. Hignett for coming so far North and presenting to them a very excellent paper.

A vote of thanks was also given to the President and Mrs. Ferguson; to the President for so ably conducting the meeting and to the President and Mrs. Ferguson for the great kindness shown to all present.

Geo. A. SANGSTER, *Hon. Secretary.*

IN PARLIAMENT

Colonial Development

In the House of Commons on Thursday of last week, Mr. MACDONALD, Secretary of State for the Colonies, presented the Colonial Development and Welfare Bill, to make provision for promoting the development of the resources of Colonies, Protectorates, Protected States, and Mandated Territories and the welfare of their peoples, and for relieving Colonial and other Governments from liability in respect of certain loans.

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The following are among the questions and answers recorded in the House of Commons recently:—

Agriculture: Credit Facilities

Mr. RIDLEY asked the Minister of Agriculture whether the credit facilities provided for in Section 25 of the Agriculture (Miscellaneous War Provisions) Act, 1940, are available for all farmers whose applications for assistance are approved by the County War Agricultural Executive Committee or only to those farmers who have ploughed up their land under the direction of the committee?

Sir R. DORMAN-SMITH: The facilities referred to are available to all farmers who require them for the purpose of carrying out the directions of the County War Agricultural Executive Committees for ploughing up, cultivating, and certain other purposes. They include assistance in the form of the provision of seeds, fertilisers, tractors, silos, and implements, and the services of contractors for ploughing, cultivating and harvesting.

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Feeding Stuffs (Waste Products)

LIEUT.-COLONEL HENEAGE asked the Minister of Agriculture what steps he is taking to popularise kitchen waste suitable for livestock saved in boroughs and urban districts among the farmers and poultry keepers?

Sir R. DORMAN-SMITH: The general steps taken to draw the attention of farmers to the use of waste food stuffs for stock feeding were outlined in the reply I gave my hon. and gallant Friend on March 18th, and in particular a report by the Pig Experiments Co-ordinating Committee on swill feeding in war-time has been published in summarised form and is available to any applicant.

LIEUT.-COLONEL HENEAGE: Will the Minister bear in mind that there is a slowness on the part of farmers to take up feeding stuffs to which they are not accustomed, and will he do his best to see that when the local authorities have accumulated this kind of feeding stuff it is not allowed to deteriorate?

Mr. R. C. MORRISON: Will the Minister put a copy of the regulations in the Library?

Sir R. DORMAN-SMITH *indicated assent.*

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Food Supplies (Animal Feeding Stuffs)

Mr. W. ROBERTS asked the Parliamentary Secretary to the Ministry of Food whether he has noticed that, in the seven months since September, 1939, there have been exported from this country feeding stuffs for animals, either of British make or imported merchandise, to the value of £261,351; and whether, in view of the shortage of feeding stuffs for home farmers, he will secure that such supplies should be retained henceforward for British agriculture?

THE PARLIAMENTARY SECRETARY TO THE MINISTRY OF FOOD (Mr. LENNOX-BOYD): I am aware that exports of feeding stuffs to the value of £241,351 were made in the period mentioned; these exports are, for the most part, necessary supplies for Eire and other British territories.

Mr. ROBERTS: Can the Minister say whether these exports will continue in the future?

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Meat (Controllers)

Mr. T. SMITH asked the Parliamentary Secretary to the Ministry of Food who has been appointed as the north-eastern area controller to the meat scheme; whether he has had any experience in the meat trade; and the terms and conditions of the appointment?

Mr. T. WILLIAMS asked the Parliamentary Secretary to the Ministry of Food whether he will state the duties of the area meat officer for South Yorkshire, the name of the officer and the conditions of the appointment?

Mr. LENNOX-BOYD: Mr. C. W. H. Glossop has recently been appointed Area Meat and Livestock Officer for the North-Eastern Area. This is a post requiring general administrative experience and powers of large scale organisation. Knowledge of the meat trade is not essential. The appointment is on the usual terms for temporary officers of the Ministry.

Mr. T. SMITH: Am I not right in assuming that this Mr. Glossop is the ex-Member for Penistone, and, if that is so, is the Minister satisfied that he has sufficient particular experience for this post?

Mr. LENNOX-BOYD: From among a number of candidates we are satisfied that, on merit, he was the best available.

Mr. T. WILLIAMS: Is it not true that this post has been obtained exclusively by political influence, and that the person to whom the job has been given has no knowledge of the meat trade, has never been associated with it and has never been associated with any other big business?

Mr. LENNOX-BOYD: In reply to the second part of the Question, the hon. Member cannot have it both ways. If we appoint someone who is interested in the trade we are accused of putting in traders to run their own trade. In reply to the first part of the Question, though he was a Member of Parliament he is in every way qualified to fill the post.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

May 15th.—Commencement of R.C.V.S. Animal Management Examination.
May 20th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.
May 23rd.—Issue of R.C.V.S. Annual Report and Voting Papers.
May 30th.—Last date for receipt of R.C.V.S. Council Election Voting Papers.
June 6th.—**R.C.V.S. Annual General Meeting.** Victoria Veterinary Benevolent Fund Annual General Meeting.
June 20th.—R.C.V.S. Committee Meetings.
June 21st.—R.C.V.S. **Council** Meetings.
June 27th.—R.C.V.S. Written Examinations begin.
July 3rd.—Provisional date for commencement of R.C.V.S. Oral and Practical Examinations.

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"Veterinary Record" Supplements

By virtue of the powers conferred upon them at the last meeting of Council, N.V.M.A., the officers of the Association and representatives of the Editorial Committee have agreed upon the publication of the minutes of the proceedings of meetings of Councils, N.V.M.A. and R.C.V.S., also of Divisions of the Association, in supplement form, the (loose) insertion of such supplements to be made only in copies of the *Veterinary Record* distributed to members of the National Veterinary Medical Association. This step has been prompted not only by the desire to restrict to N.V.M.A. members information that, so far as the proceedings of their own Council are concerned, properly should be made available to them exclusively, but by the need to effect further economies in the cost of printing and to render available for the use of the journal a supply of paper additional to that now employed.

It is proposed to issue a quarterly supplement containing Council minutes—the first of these supplements will be included in our next issue—and subsequently a monthly supplement primarily for the publication of business proceedings of veterinary societies.

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National A.R.P. Animals Committee

Veterinary surgeons and those actively assisting them in their technical organisation for the National A.R.P. for Animals Committee are requested to return completed, as soon as possible, to 36, Gordon Square, W.C.1, the form of application for registration as a Member of a Civil Defence Organisation.

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PERSONAL

Birth.—Grant.—At Abergairn, Oaklands Crescent, Chelmsford, on May 1st, 1940, to Edna, wife of William Grant, M.R.C.V.S., D.V.S.M., a daughter.

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R.C.V.S. OBITUARY

Connochie, William Dixon, Major R.A.V.C. (Retd.), Braeside, Gala Terrace, Galashiels. Graduated Edinburgh, June 30th, 1911. Died April 24th, 1940.

GENERAL OBITUARY

Lang.—At Brigg, on April 26th, Allie, beloved wife of W. W. Lang, M.R.C.V.S., of "Sunnydene," Brigg, Lincs., aged 68 years.

Deep sympathy will be extended to Mr. Lang in the loss of one who was widely and affectionately known in the profession through her constant attendance with him, as long as her health permitted, at congresses of the National Veterinary Medical Association, where she made many friends.

Mrs. Lang had a full and varied career on hospital service. On completion of her training as a nurse in Glasgow Western Infirmary she went with the British Red Cross to South Africa, doing duty in the hot-beds of typhoid fever, and elsewhere, throughout the Boer War. In the Great War she served in Egypt, in the hospital ship *Gloucester Castle* until that ship was torpedoed in the Channel, and at home stations. Awarded the Royal Red Cross (2nd Class) medal for her services, she held the Queen's Medal for South Africa and three for the Great War—five in all.

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R.C.V.S. FELLOWSHIP FOR MR. F. T. DAY

In the report of the meeting of the Council of the Royal College of Veterinary Surgeons, to be published in the quarterly supplement to our issue of next week, it is recorded that the Fellowship Diploma is conferred upon Mr. Frederic Thomas Day, M.R.C.V.S., Terrace House, Newmarket. The subject of Mr. Day's successful thesis was "Clinical and Experimental Observations on Reproduction in the Mare." Mr. Day, it will be recalled, contributed a valuable paper on "Sterility in the Mare Associated with Irregularities of the Oestrus Cycle," to the 1939 (Yarmouth) Congress of the National Veterinary Medical Association.

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COLONIAL WELFARE BILL

Under the Colonial Development and Welfare Bill, the text of which was published on Monday, provision is made for the remission of loans amounting to more than £11,000,000, which have been advanced from the United Kingdom Exchequer to Colonial Governments over the last 30 to 40 years.

Opportunity has been taken to review the whole of the financial arrangements between Colonial Governments and the United Kingdom Exchequer. Loans not remitted under the Bill total less than £4,500,000, and fall into three categories: (1) The East African war indebtedness, totalling £2,977,000; (2) certain loans incurred for productive works outside the Colonial Development Fund, amounting to less than £500,000; and (3) certain loans, incurred for productive works paid out of the Colonial Development Fund, amounting to less than £1,000,000.

The main purpose of the Bill, the second reading of which it is hoped will be taken soon after the Whitsuntide recess, is to provide for the development of the resources of the Colonies, Protectorates, Protected States, and Mandated Territories, and the welfare of their peoples, in accordance with the proposals contained in the Statement of Policy on Colonial Development and Welfare (Cmd. 6175).

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The Minister of Health, Mr. Walter Elliot, has approved the promotion of Sir Weldon Dalrymple-Champneys, Bt., M.D., F.R.C.P., Principal Regional Medical Officer, as Deputy Chief Medical Officer (Acting) of the Ministry from August 1st next, in succession to Dr. Thomas Carnwath, D.S.O., who is retiring from the public service.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE "RESERVATION" OF THE PROFESSION

To the Editor of the Veterinary Record

Sir,—It was with the greatest disappointment that I read of the decision of the R.C.V.S. and the N.V.M.A. not to ask the Government to reconsider the question of the complete reservation of our profession. To my mind there is no adequate reason why all members of 25 years and under should not join the colours. It is extremely unlikely that there will be any great call on the profession for the R.A.V.C.; further, considerable unemployment exists among our members and it cannot be suggested with any truth that there is not an ample number of practitioners to carry on the work at home.

The medical profession has been subjected to far greater pressure of work since the outbreak of war and are not completely reserved, and I therefore appeal to the Council of the R.C.V.S. to approach the authorities at once so that the "young entry" may be allowed to join the colours.

Yours faithfully,

Berkeley Lodge, F. Beckett, F.R.C.V.S.
Blandford,
Dorset.

May 6th, 1940.

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A.R.P. FOR ANIMALS: SLAUGHTER OF THE SEVERELY INJURED DOG OR CAT

To the Editor of the Veterinary Record

Sir,—In reply to the letter of Mr. Thomas Lishman, which appeared in the issue of the *Veterinary Record* of the 4th inst., I have the honour to state that Emergency Regulations are under consideration by the Home Office, and, it is hoped, will shortly be promulgated, empowering a constable or, in certain circumstances, persons other than constables where authorised by a Chief Constable of Police, to slaughter *any* animal which appears to be at large or out of control and to be dangerous or seriously injured.

Yours faithfully,
R. J. Stordy,
Chief Executive Officer,
National A.R.P. for Animals Committee.

May 6th, 1940.

* * * * *

SULPHANILAMIDE IN THE TREATMENT OF NERVOUS CONDITIONS IN DOGS

To the Editor of the Veterinary Record

Sir,—Professor Boddie in his very interesting paper, "Recent Advances in Therapeutic Agents for Veterinary Use," presented to the Yarmouth Congress and reproduced in the *Veterinary Record* of October 14th, 1939, states (p. 1240, col. 2), "It is still debatable whether sulphanilamides are of any value in the treatment of complications of distemper." I was particularly interested when I read this sentence, for at that time I was using sulphanilamide in the treatment of nervous forms of distemper with very favourable results, although the number of cases treated was too few to enable me to form any definite conclusions.

Since then I have had further opportunity to use sulphanilamide in certain forms of nervous distemper in dogs and the results have been very gratifying.

The following are a few of the cases treated:—

(1) Distemper with Nervous Complications.

In August, 1939, I was consulted about a cross-bred fox terrier dog, 8 months old, which showed the symptoms associated with well-developed distemper, namely, a profuse catarrhal discharge from the eyes and nose, diarrhoea and frequent convulsions. It had been like this for a number of days.

Treatment consisted of 7½ gr. sulphonamide-P twice daily. I did not see this animal again, but six days later the owner reported it was quite recovered. I could hardly credit this, but in the light of later experience, I presume the fits had ceased and the animal was making satisfactory progress. I made further enquiries about this dog and a month later ascertained that it was quite well.

In September, 1939, an outbreak of distemper occurred in a kennel of Pekingese. Eight to ten dogs were affected. Treatment consisted of three subcutaneous injections of mixed antigen (canine). With the exception of one animal recovery was rapid and uneventful. The exception was a young dog, which, when due for his third injection, showed almost complete paralysis of the hind legs. He was unable to walk, but could move short distances by dragging his body along the ground by means of the fore legs. At frequent intervals he had a nervous convulsion during which he would lie on his side with his back hollowed and the head extended backwards to its utmost extent. The owner informed me this animal had been showing nervous symptoms since my last visit, three days previously.

Treatment consisted of 7½ gr. sulphonamide-P thrice daily. Visiting two days later, I found this dog running about the garden with the others. Enquiries from the owner elicited the information that shortly after the first dose of sulphonamide-P the animal showed a distinct improvement.

(2) Nervous Disorders Not Associated with Distemper.

(*a*) *Meningo-encephalitis.*—A liver and white spaniel dog, about six months old, had been having fits for about a week and on the day previous to my visit he had five. When I saw him the outstanding symptoms were blindness, a staggering gait and great uneasiness. The animal could not rest: all that day he had walked about the house knocking against objects or getting entangled under tables or chairs. He bolted down any food offered to him. The temperature was slightly above normal and the eyes were injected. Tapeworm segments were apparent round the anus. There was no history nor were any symptoms of distemper manifested. Suspecting meningitis, I hesitated to prescribe worm medicine at that stage.

Treatment consisted of small doses of pheno-barbital to allay the brain irrigation and a tablet of sulphonamide-P every three hours. Under this treatment the dog was normal in three days, with the exception of slight inco-ordination of the hind legs. Four days later he had a fit. I now decided to treat him for worms and two nemural tablets were given. These acted well and complete recovery ensued.

An aged liver and white spaniel was brought to the surgery apparently suffering from a mild form of meningitis evidenced by partial blindness, restlessness and staggering. Sedatives and worm medicine were prescribed but no improvement was noticed in two days. The treatment was now changed to sulphonamide-P tablets three times daily. In two days the animal was much better but was destroyed at the owner's request.

(*b*) *Hysteria.*—Many cases of hysteria in dogs have been treated by giving a sedative to start with, followed by a sulphonamide tablet twice or thrice daily according to the size of the dog. At the same time a change of feeding was recommended. All these cases have recovered and so far there has been no recurrence.

(*c*) *Chorea.*—A shepherd consulted me about his collie bitch which was suckling a litter of pups. The symptoms he described gave me the impression she was suffering from chorea of the dorsal muscles. I prescribed a sulphanilamide tablet three times daily and the owner informed me later that the bitch had recovered.

(*d*) *Post-parturient eclampsia?*—A Scotch terrier bitch, after giving birth to her second litter of pups, showed tetanic spasms of both legs on one side. The fore and

hind legs were drawn up tight against the body and appeared to be fixed there. The temperature was elevated to 104°. In the forenoon a subcutaneous injection of calcium gluconate was given and the uterus was irrigated with an antiseptic solution. As there was no improvement by the evening a large subcutaneous injection of calcium lactate and medicinal dextrose was given. This, too, having no good effect, next day the animal was put on to sulphonamide tablets with such favourable results that she was able to rear her pups.

(3) As a Preventive Against the Nervous Complications of Distemper.

Distemper in my district is most prevalent during the months of August and September, owing to the great increase of visitors' dogs during these months. In August, 1939, I had two very bad cases of distemper to deal with. Both animals were ill from four to five weeks. One died and one recovered. Neither of them, much to my surprise, ever showed any signs of developing nervous complications. Each animal had received sulphanilamide during the course of treatment for distemper and I wondered if this prevented these undesirable complications.

If it can be proved that sulphanilamide treatment will cure nervous complications associated with distemper, it is reasonable to assume that the same treatment will prevent these complications.

Remarks.

While the foregoing notes do not prove the efficacy of treatment with sulphanilamide, they do suggest that these agents are worthy of further trial in many forms of nervous conditions in dogs and particularly in nervous complications associated with distemper.

Yours faithfully,
R. R. Moodie.

23, Bridge Street,
Rothesay,
Scotland.

[Morris and Murray (*J. Amer. vet. med. Assoc.*, 96, p. 80) have recently published their observations on "Treatment with sulphanilamide of meningo-encephalitis associated with Canine Distemper." They concluded that their treatment brought about an estimated recovery of 93 per cent., whereas the mortality commonly associated with this complication of canine distemper is essentially 100 per cent.—*Editor.*]

* * * * *

COPROPHAGY BY THE RABBIT

To the Editor of the Veterinary Record

Sir,—My thesis has been very well expressed by the anonymous poet who wrote:—

"The rabbit has a charming face:
Its private life is a disgrace.
I really dare not name to you
The awful things that rabbits do;
Things that your paper never prints—
You only mention them in hints.
They have such lost, degraded souls,
No wonder they inhabit holes;
When such depravity is found
It only can live underground."

Dr. Hare does not appear to believe this, but I assure him that it is quite true. All the evidence that was required for my own conversion from a state of incredulity similar to his own has already been published and I venture to think that were he to go through the same preliminary experimental processes (using *healthy* rabbits—for all of my experimental rabbits were healthy ones) he would arrive at the same conclusion.

The occasional revelation of important omissions in our observation of the animal world is good for the maintenance of a fittingly humble state of mind. Such an incident as the discovery of the okapi in country that was thought to have been reasonably well explored exemplifies the magnitude of these gaps in our knowledge: or the catching of *Latimeria*, in 1938, by an ordinary fisherman in an ordinary net when Zoology had written off the whole group of fishes to which it belongs as having been extinct for at least fifty million years.

Such discoveries come as a shock to our sense of orderliness, and the countryman who on first seeing a giraffe was heard to exclaim "no such animal don't exist!" was only giving expression to the feeling of incredulity that we all experience on suddenly being confronted with something quite outside our idea of the world of living things as it is.

The observation of pseudo-rumination in the rabbit is one of these surprises, and although a certain amount of scepticism is all to the good, it is fortunate for scientific workers in general, as well as for those engaged in the study of ultra-visible viruses, that it is not always necessary to *see* in order to *believe*.

I am,
Yours faithfully,
E. L. Taylor.

Veterinary Laboratory,
Ministry of Agriculture and Fisheries,
New Haw, Weybridge, Surrey.
May 7th, 1940.

* * * * *

DIAGNOSIS OF DISEASES OF SWINE

To the Editor of the Veterinary Record

Sir,—Without the pig and its ailments country practice would lose not a little of its humour: and all who have to deal with this animal will subscribe to the experiences and opinions of your correspondents, Messrs. Anderson and Hancock.

It is very annoying to both veterinary surgeon and owner not to have outbreaks, which they regard as swine fever, confirmed, owing to the absence of definite diagnostic lesions on *post-mortem* examination; but I think we must agree that, whilst we may strongly suspect the existence of the disease, without such lesions it is not possible either for us, or for the Ministry, to place the diagnosis beyond dispute.

The solution of the problem is not so easy as it looks, and whilst I fully agree that more latitude could be extended to those on the spot, its undue extension is not devoid of danger—for I have yet to find any owner who is keen to admit that he has a scheduled disease on his premises, or one who if he disagrees with you, cannot find someone else to agree with him.

In such cases I think that we can help the Ministry to support our opinion by giving them the fullest possible information in our report.

I have been tempted on not a few occasions to imitate the action of an ancestor who, incensed at the non-confirmation of outbreaks of glanders, selected an extra fine specimen of a head and sent it up by rail. He secured confirmation in record time, together with a visit from a high official who was anxious to know why he was sending up glandered heads!

In spite of all this, we can still see the humour, and console ourselves with the feeling that perhaps after all our diagnosis was not correct.

On the other hand, if still dissatisfied, we can send up complete specimens of the animal, together with food stuffs, to some laboratory; and unless we are lucky, shall in due course receive a lengthy report, which will tell us everything, except what is the cause of the death of the animal.

I still admire a colleague who, after exhausting everything possible to account for an outbreak of illness in a herd of pigs, considered that the normal soil organisms had become pathogenic, and that the only course open was to kill the remainder. If he did not experience relief, I certainly sighed it.

Yours faithfully,
J. F. D. Tutt.

"Rothiemurchus,"
St. Cross,
Winchester.

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